



**Universitas Negeri Surabaya**  
**Faculty of Engineering,**  
**Mechanical Engineering Education Undergraduate Study Program**

**Document Code**

**SEMESTER LEARNING PLAN**

<b>Courses</b>	<b>CODE</b>	<b>Course Family</b>	<b>Credit Weight</b>			<b>SEMESTER</b>	<b>Compilation Date</b>											
Coating and Corrosion Engineering	8320302225	Compulsory Study Program Subjects	T=1	P=1	ECTS=3.18	1	October 3, 2022											
<b>AUTHORIZATION</b>	<b>SP Developer</b>		<b>Course Cluster Coordinator</b>			<b>Study Program Coordinator</b>												
	Bellina Yunitasari, S.Si., M.Si.		Bellina Yunitasari, S.Si., M.Si.			Ir. Wahyu Dwi Kurniawan, S.Pd., M.Pd.												
<b>Learning model</b>	Case Studies																	
<b>Program Learning Outcomes (PLO)</b>	<b>PLO study program that is charged to the course</b>																	
	<b>PLO-5</b>	Have social competence and personality competence in mechanical engineering education																
	<b>PLO-6</b>	Able to apply and analyze pedagogical competencies in mechanical engineering education continuously throughout life																
	<b>PLO-9</b>	Able to carry out research in the field of mechanical engineering																
	<b>PLO-10</b>	Have an understanding of mathematics and basic mechanical engineering																
	<b>Program Objectives (PO)</b>																	
	<b>PO - 1</b>	Understanding the various metal plating processes, the ability to analyze the mechanism of the metal plating process, being able to differentiate between the various types of metal plating and the factors that influence the metal plating process.																
	<b>PO - 2</b>	ability to analyze the mechanism of metal plating processes,																
	<b>PO - 3</b>	can distinguish various types of metal coatings																
	<b>PO - 4</b>	factors influencing the metal plating process.																
	<b>PLO-PO Matrix</b>																	
			P.O	PLO-5	PLO-6	PLO-9	PLO-10											
		PO-1																
		PO-2																
		PO-3																
	PO-4																	
<b>PO Matrix at the end of each learning stage (Sub-PO)</b>																		
	P.O	Week																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	PO-1																	
	PO-2																	
	PO-3																	
	PO-4																	
<b>Short Course Description</b>	Understanding the various metal plating processes, the ability to analyze the mechanism of the metal plating process, being able to differentiate between the various types of metal plating and the factors that influence the metal plating process.																	
<b>References</b>	<b>Main :</b>																	

1. Anton J. Hartomo & Tomijiro Kaneko. 1995. Mengenal Pelapisan Logam (Elektroplating). Yogyakarta : Andi Offset.
2. Heryando Palar. 2004. Pencemaran dan Toksikologi Logam Berat. Jakarta : PT. Asdi Mahasatya.
3. Milan Paunovic & Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Wiley & Sons, Inc.
4. Suparni S Rahayu. Sulasih. Sudirman. 1996. Petunjuk praktikum elektroplating. Bandung: Pusat pengembangan pendidikan politeknik.

**Supporters:**

1. LKM Petunjuk Praktek Pelapisan Logam.

**Supporting lecturer**

Bellina Yunitasari, S.Si., M.Si.  
Hanna Zakiyya, S.T., M.T.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [ Estimated time]		Learning materials [ References ]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline ( offline )	Online ( online )		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Explain the understanding of electrochemistry, corrosion and metals	Able to understand electrochemistry, corrosion and metals	<b>Criteria:</b> According to the assessment rubric	Lectures, discussions, questions and answers 2 X 50	Lectures, discussions, questions and answers 2 X 50	<b>Material:</b> electrochemistry, corrosion, and metals <b>Bibliography:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i>	5%
2	Understand electroplating preparation, basics of electroplating implementation	Able to know the basics of the metal plating process	<b>Criteria:</b> According to the assessment rubric  <b>Form of Assessment :</b> Project Results Assessment / Product Assessment	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 X 50	<b>Material:</b> electroplating preparation, basics of electroplating. <b>Reference:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i>  <b>Material:</b> electroplating preparation, basics of electroplating. <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i>	5%

3	Understanding about sacrificial coatings	Able to know the various types of metal plating processes	<p><b>Criteria:</b> According to the assessment rubric</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 X 50	<p><b>Material:</b> various types of metal coating processes <b>Reference:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i></p> <p><b>Material:</b> various types of metal coating processes <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i></p> <p><b>Material:</b> various types of metal coating processes. <b>Reference:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i></p>	5%
4	Understand about decorative - protective coatings	Able to know the various types of metal plating processes	<p><b>Criteria:</b> According to the assessment rubric</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 x 50	<p><b>Material:</b> decorative - protective coating <b>References:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i></p>	5%
5	Understanding of engineered coatings	Able to know the various types of metal plating processes	<p><b>Criteria:</b> According to the assessment rubric</p>	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 x 50	<p><b>Material:</b> engineered coatings <b>References:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i></p>	10%
6	Understand about rarely used coatings	Able to know the various types of metal plating processes	<p><b>Criteria:</b> According to the assessment rubric</p>	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 x 50	<p><b>Material:</b> rarely used upholstery <b>Reader:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i></p>	5%

7	Understand about alloy coatings	Able to know the various types of metal plating processes	<b>Criteria:</b> According to the assessment rubric	presentation, discussion, question and answer 2 X 50	presentation, discussion, question and answer 2 x 50	<b>Material:</b> various types of metal coating processes <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i>  <b>Material:</b> various types of metal coating processes <b>Reference:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i>	5%
8	Understand autocatalytic coatings	Able to know the various types of metal plating processes	<b>Criteria:</b> According to the assessment rubric	Lectures, discussions, questions and answers, presentations 2 X 50	presentation, discussion, question and answer 2 x 50	<b>Material:</b> autocatalytic coating <b>References:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i>  <b>Material:</b> autocatalytic coating <b>Bibliography:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i>	10%
9	Understand about plastic substrates	Able to know the various types of metal plating processes	<b>Criteria:</b> According to the assessment rubric	Lectures, discussions, questions and answers, presentations 2 X 50	presentation, discussion, question and answer 2 x 50	<b>Material:</b> plastic substart <b>References:</b> <i>Anton J. Hartomo &amp; Tomijiro Kaneko. 1995. Getting to Know Metal Plating (Electroplating). Yogyakarta : Andi Offset.</i>	10%
10	Understand electroforming	Able to know the various types of metal plating processes	<b>Criteria:</b> According to the assessment rubric	Lectures, discussions, questions and answers, presentations 2 X 50	presentation, discussion, question and answer 2 x 50	<b>Material:</b> electroforming <b>Bibliography:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i>	10%

11	U.S.S	Able to do the questions given	<b>Criteria:</b> According to the assessment rubric	USS 2X50	USS 2X50	<b>Material:</b> Material taught at meetings 1 to 10 <b>Reader:</b> Anton J. Hartomo & Tomijiro Kaneko. 1995. <i>Getting to Know Metal Plating (Electroplating)</i> . Yogyakarta : Andi Offset.	5%
12	Able to demonstrate copper plating	Practicing the copper plating process	<b>Criteria:</b> According to the assessment rubric  <b>Form of Assessment :</b> Practice / Performance	Practice, discussion, consultation 2 X 50	Practice, discussion, consultation 2 X 50	<b>Material:</b> electroplating process <b>Reader:</b> Suparni S Rahayu. Sulish. Sudirman. 1996. <i>Electroplating practical instructions</i> . Bandung: Polytechnic education development center.  <b>Material:</b> electroplating process <b>Reference:</b> LKM Metal Plating Practice Guide.	5%
13	Able to demonstrate nickel plating	Practicing the nickel plating process	<b>Criteria:</b> According to the assessment rubric  <b>Form of Assessment :</b> Practice / Performance	Practice, discussion, consultation 2 X 50	Practice, discussion, consultation 2 X 50	<b>Material:</b> electroplating process <b>Reader:</b> Suparni S Rahayu. Sulish. Sudirman. 1996. <i>Electroplating practical instructions</i> . Bandung: Polytechnic education development center.  <b>Material:</b> electroplating process <b>Reference:</b> LKM Metal Plating Practice Guide.	5%

14	Able to demonstrate chrome plating	Practicing the chrome plating process	<p><b>Criteria:</b> According to the assessment rubric</p> <p><b>Form of Assessment :</b> Practice / Performance</p>	Practice, discussion, consultation 2 X 50	Practice, discussion, consultation 2 X 50	<p><b>Material:</b> electroplating process <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i></p> <p><b>Material:</b> electroplating process <b>Reference:</b> <i>LKM Metal Plating Practice Guide.</i></p> <p><b>Material:</b> practical instructions <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i></p>	5%
15	Able to make reports on copper, nickel and chrome plating	Conduct analysis of the metal plating process	<p><b>Criteria:</b> According to the assessment rubric</p> <p><b>Forms of Assessment :</b> Participatory Activities, Project Results Assessment / Product Assessment, Practices / Performance</p>	Discussion, consultation and presentation 2 X 50	Discussion, consultation and presentation 2 X 50	<p><b>Material:</b> electroplating process <b>Reader:</b> <i>Suparni S Rahayu. Sulish. Sudirman. 1996. Electroplating practical instructions. Bandung: Polytechnic education development center.</i></p> <p><b>Material:</b> electroplating process <b>Reference:</b> <i>LKM Metal Plating Practice Guide.</i></p>	5%
16	understand the material presented in meetings 9 to 15	Able to complete the Final Assessment correctly	<p><b>Criteria:</b> According to the Assessment Rubric</p>	Final Assessment 1 X 50	Final Assessment 1 X 50	<p><b>Material:</b> Meeting Material 9 to 15 <b>Reader:</b> <i>Milan Paunovic &amp; Mordechay Schlesinger. 2000. Modern Electroplating. USA, John Willey &amp; Sons, Inc.</i></p>	5%

#### Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	11.67%
2.	Project Results Assessment / Product Assessment	6.67%
3.	Practice / Performance	16.67%
		35.01%

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.